The Capulet (wireless DC dimmer)

Trinculo's Attic Spec Sheet

The Trinculo's Attic Capulet is a DMX-controlled wireless DC dimmer pack. Specifically designed to be easily incorporated into a costume, it can also be useful in a variety of other situations where low voltage DC dimming is needed.

The Capulet is a small 6-channel remote dimmer pack intended to be used in combination with the Trinculo's Attic Wireless Base Station. The Base Station receives DMX from a control console and transmits the DMX to the Capulet. Up to 16 Capulets can be controlled with a single Wireless base station, with an option for up to 32 Capulets in certain circumstances. See the DMX Addressing section below for details.

Characteristics

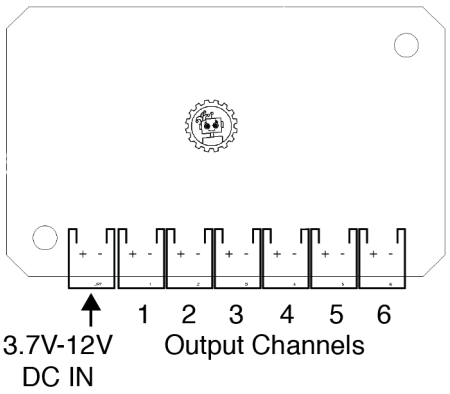
Size: 2.50" x 1.63" x 0.80" (outer case dimensions)

Weight: 2 oz.

Connectors: (7) male 2-pin 2mm JST connectors
(1 power + 6 dimmers)

Wireless: 2.4GHz/1mW Xbee radio w/ chip antenna,
operating in 802.15.4 mode

Range: 100' line-of-sight to base station



Power

The pack will smoothly dim from the input voltage to 0V. It uses a Pulse Width Modulation method for dimming, with a frequency around 500Hz. The dimmer curve is set to be linear. Maximum voltage input is 12.5V; minimum input is 3.7V, allowing operation with a single-cell lithium polymer battery.

The individual transistors driving the dimmed loads have an internal maximum current rating of about 4.8A, but due to thermal limitations should not be used to dim more than 2A each.

Note: There is no circuit protection - it is the user's responsibility to ensure that they do not exceed the above current limitations.

DMX Addressing

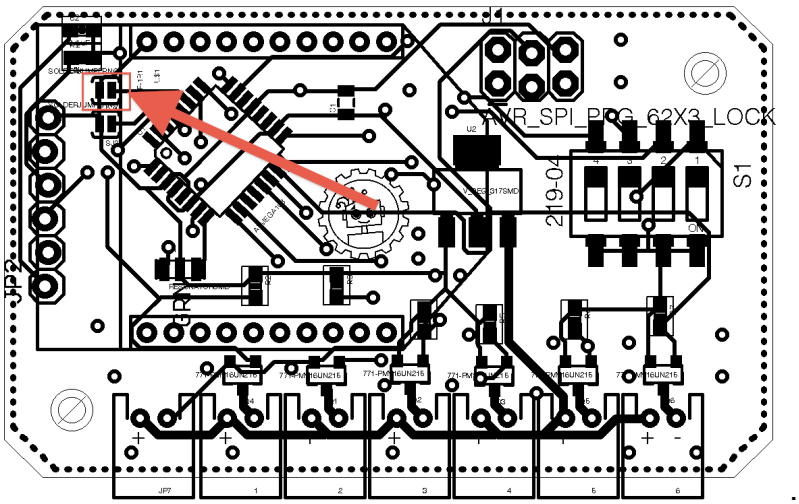
Each Capulet has a block of 4 DIP switches which sets the address of that pack to a number from 1-16. This number is how the pack identifies which channels of DMX to read from the Base Station: Pack #1 (all four switches off) is controlled by the first 6 channels received by the Base Station; that is, if the Base Station's start address is set to 1, Pack #1 is controlled by channels 1 through 6, Pack #2 is controlled by channels 7-12, and so forth.

To set the Capulet's address from 1-16, simply set the DIP switches according to the following chart:

Remote pack addressing for DMX Start Address = 1

Pack Number	DIP Switch Setting	DMX Addresses
1	↓ ↓ ↓ ↓	1-6
2	↑ ↓ ↓ ↓	7-12
3	↓ ↑ ↓ ↓	13-18
4	↑ ↑ ↓ ↓	19-24
5	↓ ↓ ↑ ↓	25-30
6	↑ ↓ ↑ ↓	31-36
7	↓ ↑ ↑ ↓	37-42
8	↑ ↑ ↑ ↓	43-48
9	↓ ↓ ↓ ↑	49-54
10	↑ ↓ ↓ ↑	55-60
11	↓ ↑ ↓ ↑	61-66
12	↑ ↑ ↓ ↑	67-72
13	↓ ↓ ↑ ↑	73-78
14	↑ ↓ ↑ ↑	79-84
15	↓ ↑ ↑ ↑	85-90
16	↑ ↑ ↑ ↑	91-96

A second group (17-32) can be created by placing a blob of solder on this jumper:



These will then respond to addresses 97-192, using the same DIP switch settings as above. We can factory-supply Group 2 Capulets upon request.

Wireless Operation

The Capulet uses a 2.4GHz/1mW Xbee radio operating in 802.15.4 mode to communicate with the Base Station. The radios in the Base Station and all Capulets communicating with it need to be configured with the same PAN ID, which is randomly assigned and printed on a label attached to each Xbee. If you are purchasing a Capulet at the same time as a Base Station, we will automatically set them to the same PAN ID; if you already have a Base Station and are purchasing Capulets to use with it, please include your PAN ID with your order.

When a remote pack goes out of range, it will freeze at the last known values until it gets a new valid data packet. Near going out of range, this tends to look like slow data updates/slow frame rate as some data, but not all, will get through.

To maximize range and minimize interference:

- Place the base station as close to the remotes as possible. 100' range should be easily achievable, but the closer the better. If you can practically and safely hang the base station upside down above the stage, do it.

- Arrange the remote packs so that the side with the dimmer # label is facing away from the body, and attempt to minimize or remove any wires crossing the pack; route wires around the pack whenever possible.
- Do not place any walls or structures between the base station and the remotes.

The Capulet operates solely in receiving mode; it does not transmit data or ACKs.

Dimming Curves

The dimming curve is set to Linear, meaning that the voltage output from the dimmer varies linearly from 0-100%. For example, the step size from 2% to 3% is the same as the step from 95% to 96%. EL Wire and LEDs do not visibly respond linearly to a linear change in voltage, but this can be handled on the light board by setting dimmer curves to have the desired effect.

A Note on Dimming EL Wire

EL Wire is not well documented, and as such it is difficult to proscribe solutions to all cases. In our testing, we found that below 5% there were some dimming levels that led to instability in the EL wire; above 5%, the dimming was smooth. Because each inverter/EL wire pair is different, we cannot provide a one-size-fits-all solution. However, if you find yourself needing to hold the EL wire in this range, adding a 0.1uF to 10uF capacitor rated for 25V or more across the input to the Inverter (NOT the high-voltage EL wire side) may stabilize the voltage without significantly increasing the fade-out time for the wire.

Accessories

Pre-terminated female JST connectors are available on our website, allowing you to easily adapt your lights or EL inverter to interface with the Capulet.

Custom Versions

The Capulet is a very versatile device and can be customized to work in a variety of situations other than simple DC dimming. Here are a just a few ways we can customize the Capulet to fit your needs:

- Modification to output signals rather than dimming (e.g. using a custom Capulet to wirelessly trigger MIDI effects, or to operate DMX devices).
- Higher-voltage or higher-power versions to control specific loads.
- Custom accessories can be built to interface with the Capulet, such as low-voltage light fixtures, EL Wire systems, and motors.

The possibilities for customization are endless. If you have something you'd like to try, give us a call!